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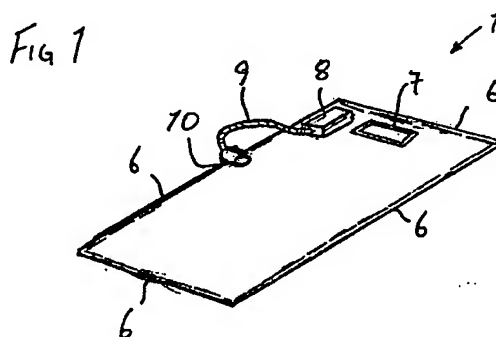
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(54) **Item support board**

(57) An item support board for supporting items such as papers, documents, maps and the like has an envelope encompassing a planar stiffening element, illumination apparatus supported relative to the board structure, and a rechargeable battery device arranged to power the illumination apparatus. The board preferably further includes programmed control apparatus controlling operation of the illumination apparatus according to an operating program.



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Description

[0001] The present invention relates to an item support board, and in particular to an item support board including illumination means for illuminating the item supported on the board.

[0002] Item support boards are known for retaining, for example papers, facilitating writing on the board. Examples of such products are "clip boards" or "pilots boards" (for use in supporting pilots charts or the like. Providing such boards with illumination means permits use at night or in conditions of poor visibility.

[0003] According to a first aspect, there is provided an item support board for supporting an item, the item support board comprising:

i) a board structure including:

a) a substantially planar stiffening element;

b) an envelope encompassing the stiffening element;

ii) illumination means supported relative to the board structure; and,

iii) rechargeable battery means arranged to power the illumination means.

[0004] It is preferred that the item support board further includes control means for controlling the operation of the illumination means. The control means preferably includes a control circuit, which control circuit is preferably retained within the envelope encompassing the board structure. The control circuit is preferably overlaid by the planar stiffening element. In one embodiment two board stiffening elements are provided laid face against face, preferably sandwiching the control circuit therebetween.

[0005] A manually actuatable switch is preferably provided arranged to switch on/off the illumination means. The manually actuatable switch preferably comprises the control circuit.

[0006] The control circuit preferably includes programmable means for controlling operation of the illumination means according to an operating program. For example, the operating program may ensure that the illumination means is only switched on or off when an actuating switch is pressed for a minimum predetermined time (such as 1 second).

[0007] In one embodiment, the control means may comprise an integrated circuit preferably a programmable interface chip. The control means preferably controls charging of the rechargeable battery means and/or start up/shut down of the illumination means. Where the rechargeable battery means is charged via mains electricity (typically via step down transformer) it is preferred that the control means is arranged to disconnect the

battery supply to the programmable chip when recharging. A switch is preferably provided for this purpose.

[0008] The provision of programmable control means (such as a programmable interface chip) has additional benefits in that the same basic hardware (board, illumination means chip and control circuit) may provide different operating functions depending upon user requirements. For example the components may be controlled to produce variable intensity light from the illumination means depending upon the length of time the actuation switch is pressed.

[0009] In one embodiment, the planar stiffening element is provided with one or more cut out portions permitting access to one or more respective elements of the control means (such as the actuation switch).

[0010] It is preferred that the illumination means comprises an LED (light emitting diode) device. The illumination means is preferably positionally adjustable relative to the board structure. Desirably, the illumination means includes a flexible stalk element having a first end mounted relative to the board structure and second end carrying the illumination means.

[0011] It is preferred that the item support board includes an item retaining element. The item retaining element may for example comprise a transparent envelope and/or a clip (such as a spring clip) for retaining papers or the like.

[0012] The rechargeable battery means may be rechargeable by mains charging and/or solar means and preferably comprises the control circuit.

[0013] The rechargeable battery means is preferably retained within the envelope encompassing the board structure. In one embodiment two board stiffening elements are provided laid face against face, preferably sandwiching the rechargeable therebetween.

[0014] It is preferred that the envelope encompassing the stiffening element comprises a plastics envelope, preferably having heat sealed edges.

[0015] According to a second aspect, the invention provides a method of manufacturing an item support board, the method comprising:

i) locating rechargeable battery means and/or a control circuit on a planar stiffening element;

ii) encompassing the planar stiffening element and the rechargeable battery means and/or the control circuit in an envelope; and,

iii) positioning illumination means to be supported relative to the board structure.

[0016] It is preferred that the rechargeable battery means and/or the control circuit is sandwiched between two planar stiffening elements. The envelope is preferably of plastics material and/ or is desirably heat sealed about one or more edges following encompassing the one or more planar stiffening elements.

[0017] The invention will now be further described, by way of example only, and with reference to the accompanying drawings, in which:

Figure 1, is a perspective view of an item support board according to the invention;

Figure 2, is a schematic sectional view of the board of figure 1;

Figure 3, is a schematic circuit diagram controlling for controlling operation of the illumination means; and,

Figures 4 to 6, are flow diagrams detailing the operation of the integrated circuit controlling operation of the illumination means.

[0018] Referring to the drawings, there was shown an item support board (generally designated 1) for supporting items such as documents, paper for writing, maps and the like. The board 1 comprises a pair of spaced stiffening boards 2,3 sandwiching therebetween a circuit board (PCB) 4. The layer arrangement comprising boards 2, 3 and PCB 4 is enveloped by a plastics membranes 5 which are heat sealed along peripheral edges 6.

[0019] The board 1 includes a spring clip 7 for retaining papers, maps, and the like and a support boss 8 (secured to upper stiffening board 2) for a flexible stalk 9 carrying a LED light 10. Stalk 9 is deformable in order to enable the orientation of the LED light to be adjusted as required by the user. Support boss 8 provides electrical connection between LED 10 and control components on PCB 4, and includes a recharging socket (not shown) for charging rechargeable batteries (as described below).

[0020] The PCB 4 carries a control circuit 11 (as shown in Figure 3) which comprises two rechargeable batteries 12,13, a programmable interface chip 15, a manually actuatable push button switch 17. The push button of switch 17 protrudes through a cut out portion of the upper board 2 enabling manual actuation via a marked touch area provided on the plastics membrane 5 covering the stiffening element 2.

[0021] Because the batteries 12,13 and chip 15 are located on the PCB 4, sandwiched between stiffening elements 2, 3, a deal of protection to the circuit is afforded, enabling the board to be safely used and effective even in conditions where mishandled to a certain degree.

[0022] The programmable interface chip 15 controls the voltage/current supply to the LED light 10. The control circuit includes a further switch 16 which operates to ensure the chip 15 is automatically disconnected when the mains recharging socket receives the male mains recharging pin. This prevents overloading of the chip 15 during recharging.

[0023] Operation of switch 17 causes the sequence of operation shown in the flow diagrams of Figures 4 to 6 as hereafter described.

[0024] Immediately upon being reconnected to the batteries 12,13 (for example following recharging or fitting if the batteries) the programmable interface chip 15 is initialised, with identified inputs and outputs being assigned to the push button switch 17 and the LED light 10 respectively as shown in figure 4. Following this the procedure enters the wait subroutine shown in figure 5. In the wait subroutine, the chip remains in sleep mode until the push button switch 17 is pressed, wherein the procedure follows on to the time out subroutine shown in figure 6.

[0025] In the time out subroutine, the chip oscillator checks at intervals of .01 seconds to find whether the push button switch 17 remains pressed. If the switch 17 remains pressed for 1 second (until variable B =99), the LED 10 is switched to its alternative state. (That is if the LED is already on it is switched off, or, if already off the LED is switched on). In this way the program of chip 15 ensures that the LED is only switched on or off following pressing of the switch for at least one second. This prevents the LED light 10 being accidentally switched on or off. If the switch is pressed for less than one second the N loop at the "switch =1" diamond is followed.

[0026] Following a switch actuation of more than one second the procedure follows the Y loop of the "switch=0" loop until the switch 17 is again pressed.

[0027] Because the chip is programmable, various on/off switching regimes may be programmed (for example to provide various switching time delays). Alternatively, the chip 15 may be used to control which of several LED's provided are actuated, or for example to facilitate varying intensity of the LED dependent upon varying times of actuation of the control switch 17. The required programme is simply input into the chip during assembly, and the required input/outputs provided. This makes an item support board according to the invention to be extremely versatile in terms of manufacture from the same hardware components but permitting user specific functionality requirements to be met.

[0028] The use of the flexible stork 9 and supportive LED 10 enables the light to be positioned and angled as required; this may be particularly important in military applications where a low level directionally orientatable light is highly advantageous.

[0029] As an alternative to rechargeable by mains, the device may include a photo diode (not shown) suitable for enabling the batteries to be recharged by solar means.

[0030] In order to manufacture the board according to the invention, the PCB 4 (having the relevant components fixed thereon) is sandwiched between the two stiffening boards 2,3 with switch 16 positioned to be actuated upon insertion of the recharging pin into the recharge socket of boss 8 (supported on board 2). Separate plastics membranes are then placed over the rel-

evant stiffening boards 2, 3 and heat sealed along the respective edges 6.

Claims

1. An item support board for supporting an item, the item support board comprising:

- i) a board structure including:

- a) a substantially planar stiffening element;

- b) an envelope encompassing the stiffening element;

- ii) illumination means supported relative to the board structure; and,

- iii) rechargeable battery means arranged to power the illumination means.

2. An item support board according to claim 1, further including control means for controlling the operation of the illumination means.

3. An item support board according to claim 2, wherein the control means includes a control circuit retained within the envelope encompassing the board structure.

4. An item support board according to claim 3, wherein two board stiffening elements are provided laid face adjacent face, the boards sandwiching the control circuit therebetween.

5. An item support board according to any preceding claim, wherein the control means:

- a) comprises control circuit including a programmed or programmable device for controlling operation of the illumination means according to an operating program; and/or,

- b) comprises an integrated circuit; and/or

- c) controls charging of the rechargeable battery means and/or start up/shut down of the illumination means.

6. An item support board according to any preceding claim, wherein the illumination means is positionally adjustable relative to the board structure, preferably including a flexible stalk element having a first end mounted relative to the board structure and second end carrying the illumination means.

7. An item support board according to any preceding claim, wherein the rechargeable battery means is

retained within the envelope encompassing the board structure, preferably wherein two board stiffening elements are provided laid face adjacent face, preferably sandwiching the rechargeable battery therebetween.

8. An item support board according to any preceding claim, wherein the envelope encompassing the stiffening element comprises a plastics envelope, having a heat sealed edge.

9. A method of manufacturing an item support board, the method comprising:

- i) locating rechargeable battery means and/or a control circuit on a planar stiffening element;

- ii) encompassing the planar stiffening element and the rechargeable battery means and/or the control circuit in an envelope; and,

- iii) positioning illumination means to be supported relative to the board structure.

10. A method according to claim 15, wherein the rechargeable battery means and/or the control circuit is sandwiched between two planar stiffening elements, and/or wherein the envelope comprises a plastics material and/ or is heat sealed about one or more edges following encompassing the one or more planar stiffening elements.

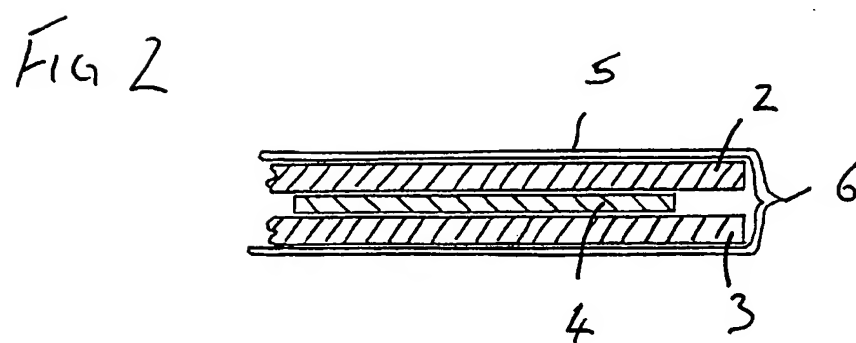
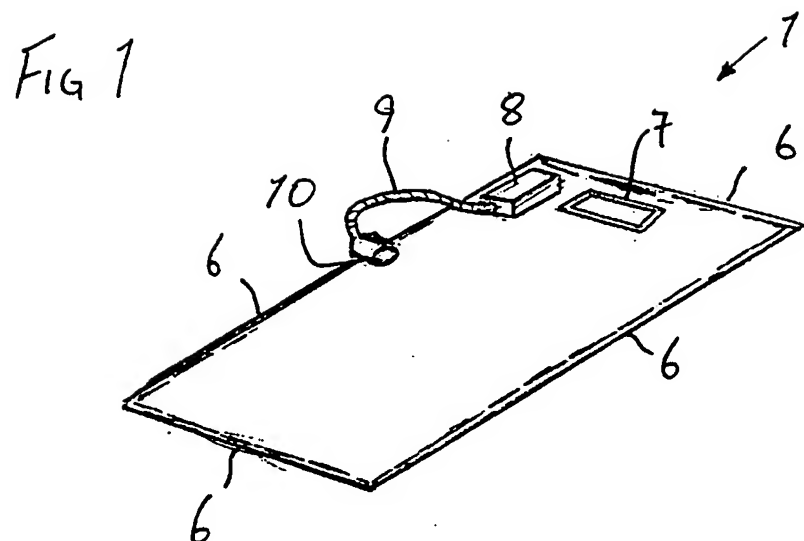


Fig 3

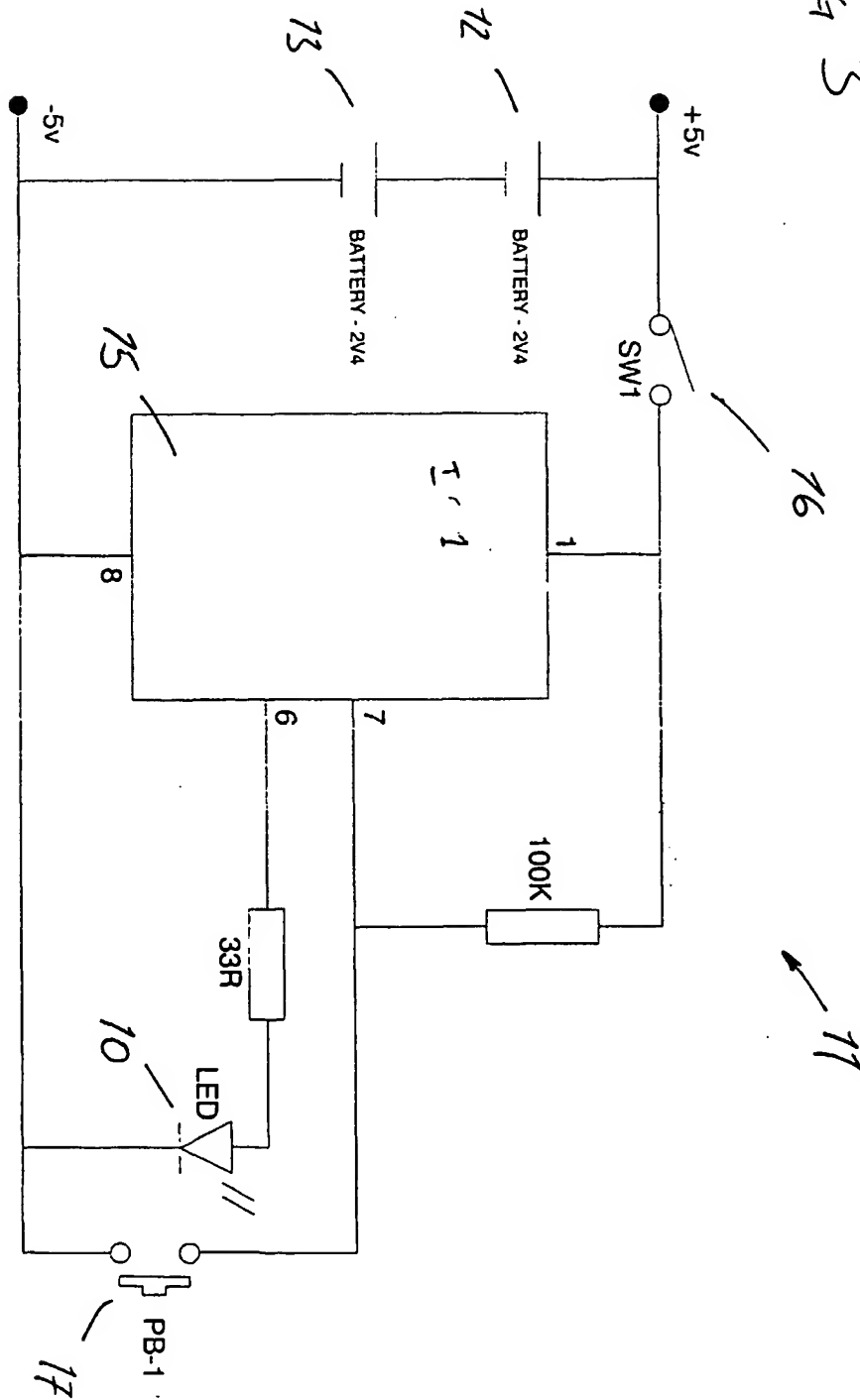


FIG 4

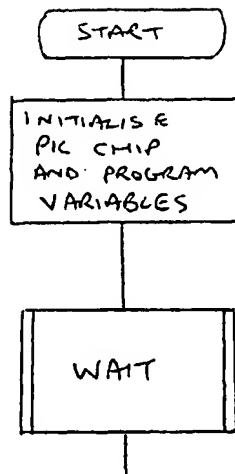
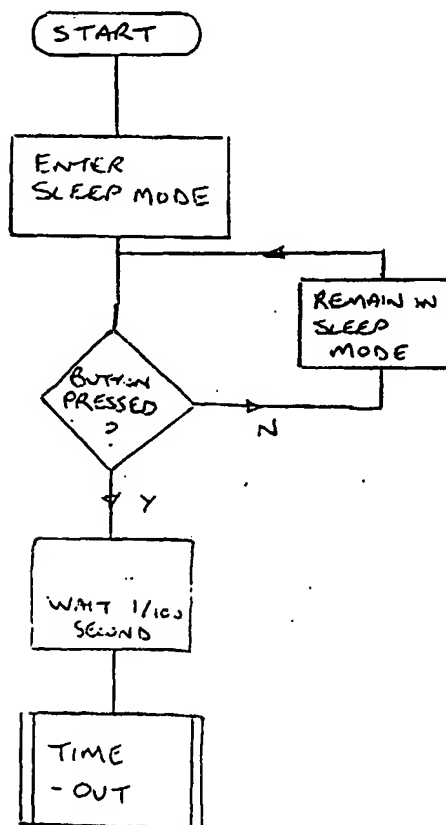


FIG 5

WAIT SUBROUTINE



TIME OUT SUBROUTINE

Fig 6

